

# Benefits of and barriers to compatible management for timber and non-timber values in British Columbia: Results of a survey

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## Abstract

Invitations to participate in a survey on forestry–non-timber forest product issues were issued to approximately 3500 individuals and organizations across British Columbia. There were 287 responses (8%), and detailed interviews were carried out with 26 respondents from among the 12 sectors that were identified. Almost half (43%) of the respondents practised or studied compatible management for timber and non-timber species. Benefits identified by respondents included economic diversification, application of sustainable forest management principles, contribution to attaining sustainable forest management certification, and enhancement of more values (economic, social, and ecological) than would be attained through timber management objectives alone. Barriers to compatible management included lack of financial incentives, legislation, policies, property rights, knowledge about non-timber forest products and capacity, as well as resistance to change within the forestry sector. Based on the survey responses, we recommend: (1) pilot studies to test the effectiveness of different access and stewardship arrangements; (2) clarification and strengthening of Aboriginal rights; (3) research on autecology, inventory methods, and economic valuation of non-timber forest products; (4) a stronger voice for the non-timber forest product sector; and (5) resolution of safety and insurance issues so that non-timber forest product harvesters can maintain access to managed land.

**KEYWORDS:** *British Columbia; compatible management; forest management; non-timber forest products; silviculture; sustainable forest management.*

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## Introduction

Non-timber forest products (NTFPs) have been defined in many different ways around the globe (Belcher 2003), but the Centre for Non-timber Resources at Royal Roads University<sup>1</sup> finds a useful definition to be “the botanical and fungal resources and associated services of forests, other than conventional wood products such as timber, pulpwood, shakes, etc.” Non-timber forest products have economic, social, and cultural significance, especially in rural areas and among people whose way of life is closely associated with forests, and among First Nations who have used these species for thousands of years. This importance, however, and their economic potential, have only begun to be widely recognized by resource managers over the past 10 years.

Over 200 commercially harvested NTFP species have been identified in British Columbia (de Geus 1995) but it is difficult to assess accurately values for this sector because the majority of the NTFP sector is neither regulated nor monitored. Both economic and non-economic values are, however, clearly important: for example, 40 species of commercial wild mushrooms (Berch and Cocksedg 2003) have a combined export value of between CAD\$8–44 million annually (Cocksedg and Hobby 2006), and floral greenery, approximately 90% of which is salal, has an export value of CAD\$25–\$60 million per annum and a domestic trade value of CAD\$2–5 million per annum (Cocksedg and Hobby 2006). Anecdotal reports suggest that NTFP harvesting activity in British Columbia is increasing, and therefore the economic values and number of people employed could be much larger than reported. Baseline information on the NTFP sector is needed because of the greater attention now being paid to the potential role of NTFPs in contributing to the sustainability of forest-dependent communities. By definition, NTFP activities take place in the forests of British Columbia, and therefore it is particularly important to explore the relationship between the NTFP sector and the traditional forestry sector, and to elucidate both perceived benefits from and barriers to the development of a healthy, sustainable NTFP industry in the province.

Forest managers have increasingly managed for an ever-wider range of non-timber values over the past decades (e.g., fisheries, wildlife, range, and

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biodiversity). This wider management of the forest resource can be defined as “compatible management” (sensu Monserud et al. [editors] 2003), to emphasize forest management practices that are compatible with managing for both timber and other values at the same time. Forest managers can help to ensure the ecological sustainability and the preservation (or enhancement) of the economic and non-economic contribution of NTFPs to forest-dependent communities, and to the province as a whole, through compatible management for both timber and NTFPs (e.g., Kerns et al. 2003; Titus et al. 2004). However, the extent to which practitioners are familiar with compatible management for NTFPs in British Columbia, and their perceptions of the benefits of and barriers to compatible management, are currently unknown. The extent, types, and results of compatible management activities, whether intentional or unintentional, are also unknown in British Columbia. This knowledge is needed to help direct future efforts to foster compatible management for timber and non-timber values in the province.

A survey was therefore conducted to gather baseline information on the interactions between the forestry and NTFP sectors in British Columbia, with the objectives of:

- assessing the degree of awareness of NTFPs in the forest industry,
- identifying the benefits of compatible management,
- determining the barriers to compatible management, and
- identifying the opportunities for compatible management.

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<sup>1</sup> Please note that in 2010 the Centre for Non-Timber Resources at Royal Roads University was renamed the Centre for Livelihoods and Ecology (<http://www.royalroads.ca/cle>).

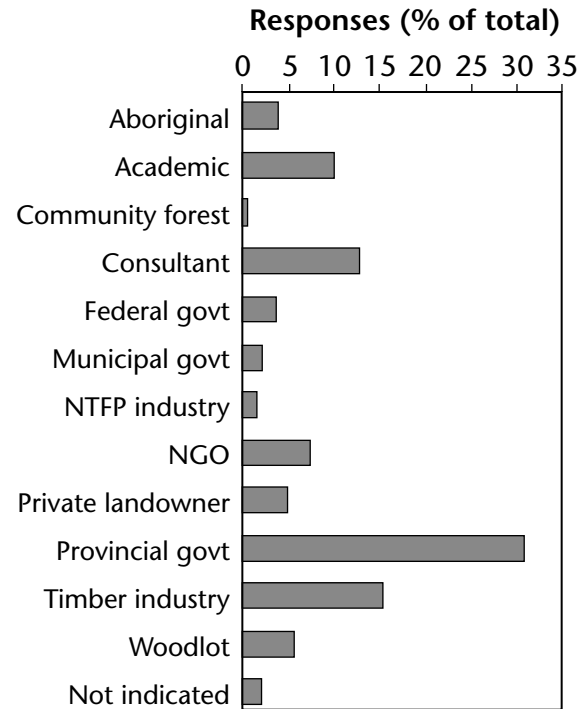
**Methods**

**Survey development and distribution**

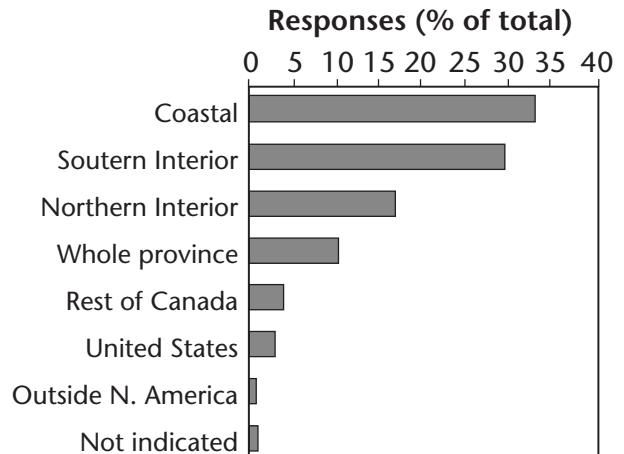
Working with FORREX and a Project Advisory Committee, we developed a survey on NTFP and compatible management awareness and activity for an undefined audience. The survey was designed to elicit largely dichotomous responses (e.g., “yes/no”), but also included questions requiring ordinal responses (e.g., “1. never heard of it; 2. heard of it; 3. work with it directly”), questions requiring open-ended written responses (e.g., “What do you see as the obstacles to land managers for conducting compatible management? Write as much as you like.”), and opportunities to clarify yes/no answers. The survey included screening questions to help ensure relevant results (i.e., some questions were linked to qualifications, such as “do you harvest?”). Participants were also asked to identify their sector affiliation by choosing from 12 pre-determined classifications (Figure 1), and identify where their work took place (e.g., Northern British Columbia, Southern British Columbia, etc.; see Figure 2). Respondents were offered an opportunity to provide contact information, on a voluntary basis.<sup>2</sup> (See survey questionnaire at end of the article.)

Through both the CNTR database and co-ordination with other organizations throughout British Columbia, we directly invited approximately 3500 people to participate in the survey either online (using Zoomarang™ software) or through hardcopy surveys mailed to individuals. Survey respondents were also asked to recommend other individuals and organizations who should be invited to participate. At this point in the survey process, particular efforts were made to identify individuals and organizations within sectors with low response rates to ensure as wide and as representative participation as possible. (A limited number of surveys were distributed to key individuals in other regions of Canada, the United States, and elsewhere for specific comments that might be applicable to the forest and NTFP sectors in British Columbia.)

A total of 287 responses were received (approx. 8% response rate). Twenty-six respondents representing all 12 pre-identified sectors (Figure 1) were identified for follow-up interviews, which were conducted by phone or in person. The interviews were used to clarify comments and opinions expressed in the interviewees’ survey responses,



**FIGURE 1.** Distribution of survey responses (%) by sectors (out of 287 responses).



**FIGURE 2.** Distribution of regions (%) in which respondents worked (out of 287 responses).

but the interviews remained semi-structured and open-ended to allow for greater participatory development of the interview (Bernard 1994; Huntington 2000).

(All survey and interview respondents were offered the option to remain anonymous, if requested.)

<sup>2</sup> Royal Roads University’s policies and procedures regarding prior informed consent were followed in this study, and are available at: <http://www.royalroads.ca/research/ethical-reviews>

**Survey analysis**

Dichotomous and ordinal responses were tallied and compared using simple Zoomerang and spreadsheet (Microsoft Excel®) summary statistics. Written responses were quantified by developing categories using a mix of categorical aggregation (i.e., combining similar statements and ideas) as well as direct interpretation. Simple tallies and Excel summary statistics were used to broadly collate and quantify written answers; the qualitative responses were then used to help explain, clarify, and summarize these quantitative analyses.

This survey, however, was not random in nature, and depended on recipients volunteering to respond rather than on surveyors eliciting answers, and therefore it cannot be used to quantify opinions in British Columbia in a general sense. Instead, it is the qualitative results of the survey, which reflect the knowledge and experience of self-selected respondents who have an interest in the NTFP sector and its interactions with the forestry sector, that are more revealing. Results of quantitative analyses must therefore be interpreted in this context; whereas a high proportion of respondents making the same comment suggests consensus of opinion, some issues raised by a lower proportion of respondents can, in fact, be more illuminating. Respondents answered the survey as individuals who often worked for private companies or different levels of government. Results are therefore those of individuals, and do not necessarily reflect the views or positions of their respective employers.

**Results**

Survey questions are provided at the end of this article, and quantitative summaries of corresponding answers are available on request from the Centre for Non-Timber Resources.

**Return rate and origin of responses**

A total of 287 responses were received from all of the sectors invited to participate (Figure 1) and from all regions of British Columbia, from other parts of Canada, and internationally (Figure 2). The largest number of responses came from provincial government employees (predominantly the B.C. Ministry of Forests and Range), the timber industry, consultants, and academics. There was only one respondent from the community forest sector, but follow-up emails showed that this sector was not identified by some respondents within this sector as their primary affiliation; many community forest representatives actually identified themselves with other sectors.

**Non-timber forest product activity**

About half (47%) of the respondents had heard of NTFPs, and 53% had worked with them directly. The categories of NTFP products identified by respondents are listed in Table 1. The NTFPs identified included berries, mushrooms, medicinal plants, floral greenery species, and specialty woods. A number of emerging products were also identified (e.g., bigleaf maple [*Acer macrophyllum*] for sap; Backlund and Backlund 2004), suggesting that the NTFP sector is dynamic and changing. Many respondents, particularly from the Northern Interior, indicated that trapping and hunting should be considered non-timber forest products. In some other provinces, and internationally, animals and their by-products (e.g., antler jewellery) are considered to be NTFPs.

**TABLE 1.** Relative harvesting activity for different groups of non-timber forest products harvested on lands managed by survey respondents, by number and percentage of 287 respondents

Activity or species	Respondents	
	No.	%
Mushrooms (including pine, morels, chanterelles)	64	22.3
Florals (including salal, sequoia, boxwood, willow)	37	12.9
Boughs and cones (including cedar, dogwood, fir, spruce, juniper, kinnikinnick, cypress, balsam fir, white pine)	21	7.3
Berries	16	5.6
Medicinals (including Labrador tea, mullein, wormwood, St. John's wort, cottonwood buds)	10	3.5
Yew	7	2.4
Character wood/burls/arbutus branches	5	1.7
Range/grazing	5	1.7
Christmas trees	4	1.4
Firewood	4	1.4
Moss	4	1.4
Cultural uses	3	1.0
Ferns/fiddleheads	3	1.0
Sap and syrup	3	1.0
Native plant propagation	2	0.7
Natural dyes (from plants and lichens)	2	0.7

**Familiarity with compatible management**

Almost half (49%) of the respondents had heard of the term “compatible management,” and slightly fewer than half (43%) stated that they were practising or studying it.

A wide range of compatible management activities was reported (Table 2); however, only 17% focussed specifically on NTFPs, and 26% indirectly incorporated NTFPs with other non-timber values (Table 2).

**TABLE 2.** Occurrence of different types of direct (i.e., specifically involving non-timber forest products) and indirect (i.e., coincidentally involving non-timber forest products) compatible management activities identified by and carried out by respondents (as percentage of 287 respondents)

Compatible management activity	Compatible management objective	Responses (%)		
		Direct	Indirect	Total
Inclusion of understorey species in operational forest plans	Sustainable forest management plans, ecosystem-based management	6.6	4.5	11.1
	Maintenance of biodiversity, ecosystem processes, endangered species	—	6.3	6.3
	Maintenance of wildlife habitat	—	3.5	3.5
	Maintenance of Aboriginal access	0.3	1.7	2.1
	Visual aesthetics, tourism	—	0.7	0.7
	<b>TOTAL</b>	<b>7.0</b>	<b>16.7</b>	<b>23.7</b>
Thinning (juvenile, pre-commercial and commercial), spacing	Timber values, increase light to understorey, provide boughs, decrease fire hazard	1.7	2.8	4.5
Provide or control access (e.g., maps, roads, permits)	Access to locate and harvest NTFP species	2.4	0.3	2.8
Harvest patterns (e.g., single stem, partial cut, retention patches, etc.)	Maintain understorey habitat	1.0	1.4	2.4
Training, education	Increase NTFP values, opportunities for compatible management	1.7	—	1.7
Pruning	Timber values, provide boughs	1.0	0.3	1.4
Riparian	Restore degraded areas with economic species	0.3	1.0	1.4
Maintenance of range		—	1.4	1.4
Management of stand for specific NTFP species (silviculture, delayed harvest)	Pine mushrooms	—	0.3	0.3
	Christmas trees	—	0.3	0.3
	Berries	—	0.3	0.3
	<b>TOTAL</b>	<b>—</b>	<b>1.0</b>	<b>1.0</b>
Controlled burns	Reduce slash; increase production of berries, mushrooms	0.3	0.3	0.7
Targeted brushing	Decrease competition for timber and for desired brush species	0.3	—	0.3
Fertilization	Increase timber values, salal	0.3	—	0.3
Multi-species, multi-structure stand maintenance	Maintain/increase understorey species	0.3	—	0.3
Agroforestry	Grow NTFPs in agricultural sector	0.3	—	0.3
Invasive plant removal	Generate revenue while removing invasive species	—	0.3	0.3
Research on economic potential	Elucidate economic potential	0.3	—	0.3

Many respondents noted the potential overlap of other management objectives with management for NTFPs (e.g., sustainable forest management plans and [or] ecosystem-based management, biodiversity, and Aboriginal cultural studies). Furthermore, respondents often mentioned that synergies between NTFP management and the management of other non-timber values should be explored; some suggested that, through ecosystem-based management, there may now be more of an opportunity for forest land managers to focus on NTFPs.

With Aboriginal government, community forest, and woodlot owner respondents, there appeared to be a correlation between their awareness of the NTFP harvesting taking place on land they managed and their practice of compatible management (Figures 3 and 4). This is not surprising, and suggests that these groups may benefit the most from practising compatible management and may respond well to known NTFP harvesting taking place on land they manage. Follow-up interviews revealed that representatives of these groups believed that they had either informal or recognized

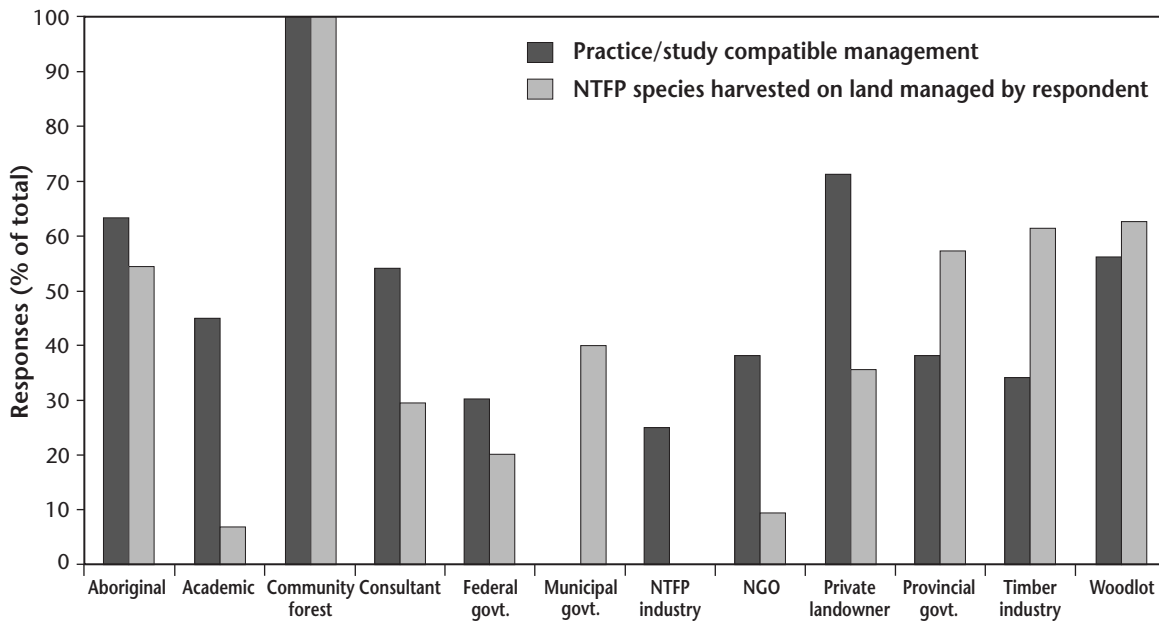


FIGURE 3. Proportion of respondents within a sector who indicated that they practised or studied compatible management, or that NTFP species are harvested on land they manage (as % of responses from that sector).

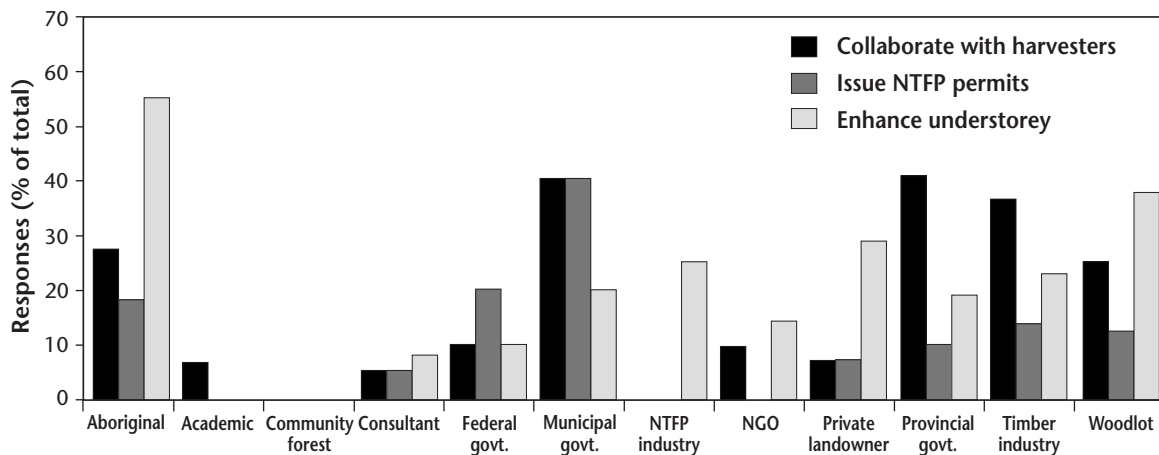


FIGURE 4. Proportion of compatible management activities carried out within a sector (as % of responses from that sector).

rights over the understorey species, and generally a high level of interest in and capacity to use NTFPs.

Approximately 71% of private landowners reported practising compatible management, but there was much less known NTFP harvesting activity (approx. 35%), suggesting that NTFP harvesters are not yet taking advantage of any increase in resource availability. Timber industry respondents, on the other hand, reported much more NTFP harvest activity (approx. 60%) than compatible management activity (approx. 35%); based on written responses and follow-up interviews, compatible management for many members of the timber industry sector appears to consist of “allowing” NTFP harvesting without actively enhancing or encouraging it, or including it within forest management plans (Figures 3 and 4).

The survey did not distinguish between the practice and the study of compatible management, so it is not surprising that the academic, consulting, and non-governmental sectors, which usually study compatible management but have no land management responsibilities, had a much higher response for practising/studying compatible management than for either harvesting NTFPs or carrying out specific management activities (Figures 3 and 4). Many community forest representatives and private landowners responded that they “practised compatible management” (100% and 71%, respectively), but when asked about specific practices, such as “collaborate with harvesters,” “issue permits,” “increase access,” or “enhance understorey,” response rates were much lower (maximum 29%), which may suggest that NTFPs are not a prime focus of their compatible management activities. Responses for Aboriginal governments and woodlot owners, on the other hand, showed close correlation between claims of compatible management practice and actual enhancement of the understorey. It is notable that 9% of respondents (28) issued permits for NTFP harvesting.

### **Perceived benefits of and opportunities for compatible management**

Survey respondents indicated a number of benefits that they felt are (or could be) realized from the practice of compatible management (Table 3). The benefit most commonly mentioned was economic diversification (22%), and the value that NTFPs could provide between rotations and as seasonal supplements to other forms of income was often cited. A number of respondents with forest management responsibilities noted that although

the benefits of compatible management would not apply to them directly, the increased economic return to communities would indirectly benefit everyone.

The practice of sustainable forest management was noted as another benefit by 16% of respondents. It was often stated that current forest management does not sufficiently take into account other forest values. Many respondents noted the synergies between the goals of compatible management of NTFPs and the goals of wildlife management, First Nations and community access, biodiversity, and ecosystem-based management. There were suggestions that compatible management for NTFPs (and other non-timber values) would greatly enhance other non-timber goals as well as the health of forest ecosystems, and help provide for the long-term stability of forest resources. Some respondents noted that compatible management of NTFPs and timber is integral to ecosystem-based management, which is being implemented on the central coast of British Columbia.

Some respondents noted that compatible management and increased communication between the timber and NTFP sectors would increase the security of forest management areas, and also reduce costs associated with improper NTFP harvesting (e.g., poor pruning practices used by bough harvesters). A few respondents noted that compatible management could help increase public participation in forest planning processes, and certification was also mentioned as an incentive for practising compatible management.

### **Perceived barriers to compatible management**

Overall, many barriers to instituting compatible management were identified (Table 4).

#### *Financial barriers and lack of legislation*

Respondents identified underlying financial barriers related primarily to the lack of incentive (or the existence of disincentives) for resource managers to invest in the NTFP sector because of the absence of defined property rights, and therefore their inability to benefit from investments. This relates directly to tenure: 20% identified lack of provincial legislation and policies as barriers to compatible management. For example, it was suggested that while there were many opportunities for compatible management, it occurs primarily on private lands (including First Nations lands), community forests, woodlots or other land where resource rights are formally established, or where there is a strong commitment to holistic forest management (even though formal rights to NTFPs have not been fully defined).

**TABLE 3.** Relative importance of different types of actual and perceived benefits of compatible management, as identified by respondents (percentage of 287 responses)

<b>Benefits</b>	<b>Details</b>	<b>%</b>
Diversify economy	More economic opportunity/jobs/stability	17.1
	Subsistence economies	1.0
	Value-added/new markets	3.1
	Mid-rotation revenues	1.0
	<b>TOTAL</b>	<b>22.3</b>
Sustainable forest management/ ecosystem management	Holistic, multi-use; better land value	14.3
	Better stewardship	2.1
	<b>TOTAL</b>	<b>16.4</b>
Direct benefits to the land managers	Financial	6.3
	Enhance credibility and reputation	2.8
	<b>TOTAL</b>	<b>9.1</b>
Social benefits	Recreation/ ecotourism	5.2
	General	1.7
	Increased communication	0.7
	Decreased confrontations between forestry and NTFP sectors	0.3
	<b>TOTAL</b>	<b>8.4</b>
Conservation/protection/ restoration = healthier forest	Preserve critical habitat/biodiversity = ecosystems more resilient to change	5.6
	Botanical/wildlife	1.7
	<b>TOTAL</b>	<b>7.3</b>
Increased co-ordination/co-operation, more efficient use of resources	Enhance site productivity/road management/access	3.5
	Partnerships with other industries/ government agencies	2.1
	<b>TOTAL</b>	<b>5.6</b>
“Endless”	Too many benefits to list	4.2
	Potential is huge; not being actualized	1.4
	<b>TOTAL</b>	<b>5.6</b>
Education, research/better understanding	Study effects of development on timber and NTFPs	0.7
	Educate society; enhance ecosystem values	2.8
	<b>TOTAL</b>	<b>3.5</b>
For community forests and woodlots	Small landholders could obtain “farm status” and (or) increase production	2.8
Co-management with First Nations Fulfilling legislative requirements	Improved relations/limit conflict/learn	2.4
	Compliance	1.0
	Meet Kyoto targets for carbon	0.7
	<b>TOTAL</b>	<b>1.7</b>
Certification	Help obtain forest certification (e.g., FSC and SFI)	1.0
Mushrooms: manage for increased production and conservation	Mycorrhizal inoculation of crop trees	1.0
Mountain pine beetle	Use NTFPs to help restore affected areas	0.7



**COMPATIBLE MANAGEMENT FOR TIMBER AND NON-TIMBER VALUES IN BRITISH COLUMBIA**

**TABLE 4.** Relative importance of different types of actual and perceived barriers to compatible management, as identified by respondents (percentage of 287 responses).

<b>Barriers</b>	<b>Details</b>	<b>%</b>
Financial	Administration costs (staff/time/resources)	5.9
	Costs to forest companies; don't want to share land (investing in someone else's interest)	10.8
	No money available (for initiatives, research, pilot projects, monitoring, etc.)	3.5
	No economic benefit to land managers	9.1
	<b>TOTAL</b>	<b>29.3</b>
BC legislation/ bureaucracy	No policy incentives/policy disincentives	9.1
	Lack of regulation/no tenures or rights	8.0
	Lack of government support	3.1
	<b>TOTAL</b>	<b>20.2</b>
Current forest practices	General resistance to change/continue status quo/lack of ingenuity (focus on timber)	18.1
	Lack of accountability/monitoring	1.7
	<b>TOTAL</b>	<b>19.9</b>
Lack of knowledge/ education	Lack of information/research on which to base management decisions	7.3
	Inventories	2.8
	Biology/sustainable harvest	2.8
	Importance/value of NTFPs	4.5
	Markets	1.4
	<b>TOTAL</b>	<b>18.8</b>
Conflicting use	Difficult to co-ordinate/incompatibility	4.5
	Jeopardize timber harvesting	1.4
	Roads (forestry vs. NTFP traffic; road decommissioning)	2.4
	Competition for resources	1.0
	<b>TOTAL</b>	<b>9.4</b>
NTFP harvesters	Resent regulations/permits; unwilling to pay	3.1
	Lack of organization/political power	2.1
	Secrecy	1.0
	Little supervision	0.7
	<b>TOTAL</b>	<b>7.0</b>
Conflicting forest management objectives	Self interest; difficult to maintain partnerships	3.1
	Lack of co-operation/communication	3.1
	<b>TOTAL</b>	<b>6.3</b>
No commercial NTFP value	Not enough to be economically viable; difficult to compete	1.7
	Limited markets/marketing	2.8
	Perishability issues	0.3
	<b>TOTAL</b>	<b>4.9</b>
Safety/insurance/liability	Garbage/fire/damage to infrastructure	3.8
	Difficult to manage access	3.5
First Nations	Aboriginal rights may conflict with tenure rights/commercial development	1.0
	Treaty issues	1.0
	Ignorance of traditional uses/lack of FN involvement	1.0
	<b>TOTAL</b>	<b>3.1</b>
Environmental values not considered	Economic concerns over ecological	2.8
Environmental damage	Over-harvesting of NTFPs	1.0
	Logging practices damage NTFPs	0.7
	<b>TOTAL</b>	<b>1.7</b>
Trust	Previous bad experience with NTFP sector	1.0

Many respondents were very clear that there is no incentive to invest in compatible management for NTFPs when that investment cannot be protected. Not surprisingly, many respondents (particularly in interviews) indicated that the government is not providing leadership in this area:

- there are currently no NTFP rights allocated or there is no management of NTFPs on the vast majority of Crown lands, and
- other government policies hinder the ability of forest managers to conduct compatible management for NTFPs.

Specific policies mentioned included allowable annual cut requirements and restocking standards, neither of which were flexible enough to encourage or allow the inclusion of NTFP management.

Many respondents noted that the current results-based *Forest and Range Practices Act* is an impediment to moving forward towards compatible management. One respondent noted that the Act does not provide for or encourage “accountability, monitoring, strong strategic direction, [or] incentives to rise to the higher common denominator.” Further, monitoring by the government now occurs after timber harvest rather than during the planning phase, thus making it difficult to ensure NTFP considerations are incorporated into plans. This opinion was stated by respondents from a range of sectors including the forest industry, Aboriginal government, and the B.C. Ministry of Forests and Range. One timber company representative confirmed that their sustainable forest management plans were developed by lawyers rather than foresters, and were designed to meet only minimum requirements; as NTFP management is not a requirement set by the government, it is not addressed. Interestingly, this same company had in the past developed a simple predictive mapping system for chanterelle mushroom habitats by identifying common terrain resource information management map aspects and ecosystem traits known to be associated with good habitat, and used these criteria to map mushroom habitat within their tree farm licence; these maps were then sold to interested mushroom harvesters.

On the other hand, there are some forest companies that are taking the initiative to provide clear compatible management strategies by incorporating NTFPs directly into their sustainable forest management plan criteria and indicators, and establishing the necessary baseline information. It was also noted that some companies

respond well to suggestions for incorporating NTFPs into their forest management plans, such as coordinating identified habitat for specific NTFP species with landscape-level plans.

#### ***Current forest practices and resistance to change***

Another 20% of respondents in both the survey and follow-up interviews felt that current forest practices and a timber-focused approach are barriers to moving forward with compatible management. Many respondents also mentioned that they had attempted to bring attention to or pursue compatible management opportunities—including raising the concepts at planning meetings or, in a government role, soliciting the forest industry to adopt certain practices—but were unsuccessful.

#### ***Capacity and information barriers***

Almost 20% of respondents identified a lack of knowledge and a need for more information as barriers. This spanned all the forestry and NTFP sectors, and was reinforced by written responses. Identified knowledge gaps included information on the distribution, autecology (i.e., ecology of a single species), abundance, current and potential values of NTFP species, and the social, economic, cultural, and ecological impacts of the NTFP sector. Models and simulations were suggested as potentially useful forest management tools.

Many responses, particularly from the forest industry, noted that there will be little interest in pursuing compatible management until it is demonstrated that the NTFP sector is economically viable; sound economic cost-benefit models would be necessary before some land managers would consider initiating compatible management for timber and NTFPs. A few respondents noted, however, that some of the information necessary for cost-benefit analysis at a stand level is known to local resource users. For example, one respondent from the Prince George area noted that in one good berry area (thinned stand with gaps in the canopy), the berries are worth approximately \$1200 per hectare. Another respondent noted that the cost of spacing in the same region was approximately half of the value of berries (\$600 per hectare). There is also a great deal of anecdotal information available from NTFP harvesters that has not yet been collated and disseminated.

A lack of information on some forest management activities was also apparent. For example, there was a clear lack of consensus on the economic value of

silvicultural activities such as pruning and thinning. Many respondents also noted that currently little silvicultural work was done in British Columbia because provincial funding was no longer available for it.

The lack of capacity and resources needed to address NTFP sector issues was commented on by many respondents, particularly those within the provincial government; most B.C. Ministry of Forests and Range district offices have experienced large staffing cuts in recent years, and are no longer able to address issues outside of their specific mandate, including NTFPs.

#### ***Lack of input from non-timber forest product sector***

It was suggested that a single voice speaking on behalf of the NTFP sector would assist in moving compatible management forward; the NTFP sector is presently unorganized, impeding communication to and from forest managers. Resource managers therefore knew little of what was happening within the NTFP sector. Some respondents from the forestry sector suggested that it is important for the NTFP sector to communicate their needs to land managers. For example, one interview respondent from the timber sector tries to incorporate NTFP concerns once they are known, and co-ordinates the location of leave patches with areas containing identified traditional-use species; as an illustration of this approach, they no longer cut down yew left in clearcuts.

One forest sector respondent stated that they did not perceive that working with the NTFP sector was a high priority because they heard little about their needs. Another noted that they practised compatible management for some non-timber values “but not for products without a defined stakeholder or market-base.” It is unlikely that major forest licensees will become involved in NTFP businesses themselves and, as a result, most forest managers are presented with neither an internal nor an external business case for investing in NTFP management.

Perceived and real conflicts, especially between the timber industry and the NTFP sector, were often mentioned as barriers, and there appears to be a lack of communication or understanding between sectors. However, conflicts between other groups were also mentioned, including environmental sector conflict with both the timber and NTFP industries, and conflicts between tourism and both the timber and NTFP industries.

#### ***Safety and insurance barriers***

About 4% of respondents noted a number of concerns about safety and liability. For example, forest managers are concerned that landowners or licensees will incur liability for activities of NTFP harvesters if an NTFP harvester is given explicit permission by managers to work on their lands. There are concerns that NTFP harvesters are often unable or unwilling to comply with the same health, safety, and environmental standards required of forest company employees or subcontractors; they also may not carry appropriate insurance. These same safety and insurance issues were also noted by some concerned respondents from the NTFP sector.

#### ***Other barriers***

Access to NTFP species for harvesting and distance to markets were mentioned by a number of respondents as barriers to compatible management. It was also noted that complications with timelines, communication, and multiple responsibilities might be difficult to overcome. For example, timing of timber harvest can affect the work plans of NTFP harvesters, based on NTFP species’ requirements, and may eliminate the window of opportunity for NTFP harvest. It was further noted that a lack of ability to monitor NTFP harvesting within a compatible management system would be an impediment to its implementation.

## **Discussion**

Results from both the survey and follow-up interviews revealed that respondents held a wide range of knowledge and experience of the NTFP sector and compatible management. Opinions about the value of compatible management varied, and were sometimes opposing; whereas one respondent stated that “managing forests for other products will drive the cost of timber production up,” another stated that it provided “particular opportunities to add some incremental community value to offset any potential costs from moving to an EBM [ecosystem-based management] model.”

Some of the issues around incorporation of one resource sector into another are not new. One respondent noted that “interdepartmental/organizational communication, territorialism, lack of involvement of actual private landowners, funding limitations and mal-structuring” were also once barriers to incorporation of fishery values into forest management planning (e.g., Lackey et al. 2006).

### Current forest policies and tenure

The absence of property rights for NTFPs was identified as one of the leading barriers to compatible management. Section 168 of the *Forest and Range Practices Act* states that the Lieutenant Governor in Council can make regulations with regards to obtaining botanical forest products on Crown forest land. This could include establishing a licensing scheme to regulate botanical forest product; however, regulations or standards have yet to be adopted (Tedder et al. 2002). Community forest agreements (created in 1998) are the only form of tenure that provides rights to harvest, manage, and charge fees for botanical forest products on Crown lands (Section 43.3, *Forest Act*). As small islands in a sea of unregulated access, however, these tenure rights are of limited value. Furthermore, whereas property rights are likely necessary (see below), they are not sufficient on their own to encourage compatible management for timber and NTFPs. Some forest districts are concerned about this lack of regulation and are, out of necessity, taking their own initiative on regulations. However, notwithstanding the current lack of regulations for Crown land, survey results showed that 28 individual respondents or organizations presently issue permits.

Clearly, forestry and NTFP practices have evolved to the point where formal recognition of property rights and concomitant regulations are required to protect both the forestry and NTFP sectors. Many respondents noted that provincial government leadership is now required, and that a higher priority was needed for both legislation and appropriate funding if the NTFP sector is to progress. Although the NTFP sector and compatible management issues have been explored by the B.C. Ministry of Forests and Range for over a decade, activities are still at the research project level; possibilities for management of non-timber forest products have been explored in British Columbia, but have yet to reach the pilot project stage (Tedder et al. 2002). Without legislation and policy, and without appropriate funding from the B.C. Ministry of Forests and Range, it is clear that many forest managers and NTFP harvesters will be unwilling to invest in compatible management.

Sufficient analysis of the needs of the forestry and NTFP sectors is required, however, if legislation and policy are not to become a double-edged sword. A few respondents spoke of the need to promote the NTFP sector only on private lands so that large forest companies would not dominate the sector. This can be

seen to some extent in the growing interest in some deciduous trees which conventionally have been of little interest to the large timber industries. For example, paper birch (*Betula papyrifera*) is an important cultural species for many Aboriginal people in British Columbia. It has often been considered a weed species in the past by the forest industry, but is the “\$1000 birch tree” to others (Gitxsan Chief Negotiator Don Ryan, in Turner and Cocksedge 2001). Birch is, however, increasingly of interest to some forest companies for oriented strand board production. Unfortunately for the NTFP sector, the current forest licensing system enables large companies to access birch, but there is not an effective permit system that allows small-scale NTFP harvesters legitimate access to the resource as well (Centre for Non-Timber Resources 2006b). This inequity decreases the availability of birch that was traditionally (although informally) available for specialty NTFP harvesters.

Furthermore, implementing legislation without appropriate involvement of the NTFP sector may lead to the situation that exists in the United States where legislation established a system of permitting but does not enable monitoring for sustainability of NTFP species, and does not encourage compatible management.

### Capacity

Many land managers who were resistant to instituting compatible management perceived that the NTFP sector was simply too small to justify the investment of time or money; however, respondents also noted that they had little idea of the current (or potential) worth of the sector. Assumptions about the NTFP sector and its role in rural communities may be inaccurate. Unfortunately, there is currently little information on the amounts and values of NTFPs harvested in British Columbia, although some estimates have been made at the provincial and regional level (e.g., Wills and Lipsey 1999). Some studies have determined NTFP species values at the stand level (Burton et al. 2000; Fredrickson 2000; Cocksedge and Hobby 2006), but there has been very little research on this in British Columbia. This lack of knowledge is an impediment to cost-benefit analysis for timber-NTFP compatible management. A spiralling situation has thus arisen in which companies will not invest in NTFPs until it is determined to be viable, but viability cannot be determined without investment in research.

Some of the required information is available, however. For example, spacing in parts of the Prince

George region costs approximately half of the value of berries under thinned stands (\$600/ha vs. \$1200/ha); salal values are often over \$1000/ha on Vancouver Island, and can reach extremes of \$10 000/ha. Nevertheless, it is difficult to compare silvicultural costs with the benefits of NTFP financial values because the profit margin for NTFP harvesting is usually not known. If forest managers had rights to NTFP resources, then they might be able to charge 5–10% of the value of NTFPs for permits, based on some permitting systems used in the United States (Tedder et al. 2002). Although not a large sum, the annual value of permits has to be weighed against the once-per-rotation costs of many silvicultural treatments. In addition, NTFP permit revenues represent a more immediate financial return on silvicultural investments compared to timber revenues at the end of a rotation. There are also benefits that are not as tangible: NTFPs can provide local cash flow and hence help sustain the rural communities that forest company workers may live in.

The lack of autecological knowledge about NTFP species is problematic, as this information would assist in determining NTFP species inventories and compatible management strategies. A growing number of studies have been conducted on NTFP species (e.g., Atwood 1998; Burton 1998; Olivotto 1998; Burton et al. 2000; Berch and Wiensczyk 2001; Ehlers et al. 2003, 2007; Newsome et al. 2005; Cocksedge and Titus 2006), and the literature on early-rotation NTFP species has been reviewed (Kerns et al. 2003). Some recent literature also exists on compatible management strategies and NTFP inventory methods (Titus et al. 2004; Cocksedge [editor] 2006); however, this growing body of knowledge is not keeping pace with the needs of the dynamic and expanding NTFP sector. Traditional ecological knowledge about NTFPs also needs to be collated and brought to bear on modern forest management practices (Davidson-Hunt and Berkes 2001).

Studies have been carried out and legislation enacted in the past to ensure the sustainable management of a few species of proven economic value and for which there were sustainability concerns, including Pacific yew (*Taxus brevifolia*). It was found in the 1960s that Pacific yew bark contains an anti-cancer compound, paclitaxel (Taxol®). The previously non-commercial Pacific yew quickly became a commercial

species, but research on it only began when sustainability became a concern (e.g., Pilot Inventory for Pacific Yew [de Jong and Bonner 1995]); protective legislation was also enacted. Given the nature of the NTFP sector (which ranges from independent, easily recruited harvesters up to large multinational corporations), the general lack of knowledge of NTFP species, and the potential for identification of new species with novel uses and high values, sudden and large shifts in species of interest or harvesting levels can occur. Proactive rather than reactive inventories and legislation are required so that the NTFP sector can remain dynamic and yet sustainable, both ecologically and economically.

### **Non-timber forest products and certification**

Some certification schemes have explored inclusion of objectives as well as criteria and indicators for some specific commercial NTFPs (Cocksedge 2003) and for NTFPs in general (Bueren and Blom 1997). As certification of forest stewardship becomes more prevalent in British Columbia, the inclusion of NTFPs in the certification process may provide increased incentives for their management by the forestry sector. Certification processes also provide opportunities for various indicators to be used as proxies for NTFP management.

### **Compatible management of timber and non-timber values: Beyond non-timber forest products**

Although compatible management for timber and NTFPs is still relatively novel in British Columbia, management of forests for timber and for some non-commercial values (e.g., wildlife, water, biodiversity) is mandated in legislation and practised throughout the province. Management of forests for other commercial values has, in some cases, also long been practised (e.g., grazing). The distinction between marketable forest products and environmental services will likely become more blurred over time as new products and services become established (e.g., carbon sequestration). Furthermore, there are possibly synergies in management of forests for a full range of forest products and values, with no one set of uses necessarily presumed to be pre-eminent.

## Conclusions and management implications

Results of the survey and follow-up interviews demonstrate interest in NTFPs and compatible management for them in British Columbia. However, respondents found that incentives for compatible management are weak and that, without stronger leadership from the provincial government, forest managers are unlikely to invest in practices to support the emerging NTFP sector. (See also the broader recommendations regarding the NTFP sector in British Columbia presented by Gagné et al. [2004] and Tedder [2002]).

Based on survey responses, we recommend that the B.C. Ministry of Forests and Range collaborate with other provincial ministries and agencies responsible for economic development and resource management to develop a provincial strategy for NTFPs and allocate funds to support research, extension, professional education, policy development, infrastructure, and other activities necessary to support the incorporation of NTFPs into sustainable forest management.

More specifically, we recommend that:

- the B.C. Ministry of Forests and Range support the implementation of adaptive management projects that would design and test a range of access management and stewardship arrangements to determine their effectiveness in creating incentives for investment in compatible management of timber and NTFPs as well as secure equitable access and benefits at the community level;
- the rights of Aboriginal peoples to NTFPs be clarified and ensured;
- the B.C. Ministry of Forests and Range provide support for in-depth case examples of compatible management and NTFPs to identify a range of practices that can then be incorporated into forest extension and forest management training programs;
- research on the autecology of NTFP species, inventory methods, and economic valuation be carried out so that management and economic tools can be developed;
- the NTFP sector develop a unified, recognized voice to enable better communication with resource managers and other policy-makers; and
- safety and insurance issues be resolved so that NTFP harvesters are able to maintain access to NTFP harvesting areas.

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*Respondents found that incentives for compatible management are weak and that, without stronger leadership from the provincial government, forest managers are unlikely to invest in practices to support the emerging NTFP sector.*

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*“[I]t can be as simple as putting the right people in place to realize new paradigms and pursue proactive measures—the rest ends up seeming like common sense.” (A survey respondent)*

## Note

This article contains information on the ecology and management of non-timber forest products. In promoting implementation of this information, the user should recognize the equitable sharing of benefits derived from the management and use of this product (Article 8(j) of the United Nations Convention on the Conservation of Biological Diversity). Where possible, the reader should involve the keepers of this knowledge and encourage customary use of biological resources in accordance with traditional cultural practices that are compatible with the conservation and sustainable use requirements (Article 10(c)).

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## Survey questions for baseline study of compatible management examples in British Columbia

1. Which of the following most closely describes your involvement with non-timber forest products such as wild mushrooms, floral greenery, medicinals, and their associated services such as edu-tourism (but not including things like hunting, hiking, or biodiversity)?
  - \_ Never heard of them
  - \_ Heard of them but never had anything to do with them
  - \_ Work with them directly (such as study, industry, or land management)
2. Which of the following most closely describes your familiarity with the concept of “compatible management” (managing a forest to enhance both timber and non-timber products – for example, thinning to increase the value of timber and also increase light for specific understorey species)?
  - \_ Never heard of the concept
  - \_ Heard of it but don’t currently practice or study it
  - \_ Currently practice or study it
3. If you practice or study it, please describe the focus.
4. The goals of compatible management are consistent with other approaches such as ecosystem management, agroforestry, and sustainable forest management. If you or your organization wanted to conduct a study on “compatible management,” where might you look for information on how, what to do, who to contact, etc.?
5. What do you see as the opportunities for compatible management in BC? What benefits would there be for land managers, such as in your organization, and others in BC? Write as much as you like.
6. What do you see as the obstacles to land managers for conducting “compatible management?” Write as much as you like.
7. Have you ever approached a land manager about harvesting/studying/managing non-timber forest products? If yes, what was the response or outcome?

The following six questions are for people who work for an agency or organization that manages forest land (such as Ministry of Forests and Range, private landowners, or forest companies). If you don’t work for a land management organization, you may skip to Question 14.

8. Are there any non-timber products harvesting or any other non-timber forest product-related activities occurring in the forest that you or your organization manage? If you don’t know, please skip the question. If yes, please describe as specifically as possible. Has the activity increased, decreased, or stayed the same in the last five years?
9. Have you or your organization ever contacted, or been contacted by, people in the non-timber forest industry to discuss co-operation opportunities (for example bough collectors or oil distillers when you are pruning)? If you don’t know, please skip the question. If yes, please describe as specifically as possible. Has the activity increased, decreased or stayed the same in the last five years?
10. Do you or your organization issue access permits for non-timber forest products on forest land that you manage? If you don’t know, please skip the question. If yes, please describe as specifically as possible. Has the activity increased, decreased or stayed the same in the last five years?
11. Have you or your organization ever taken actions to increase or maintain access for non-timber forest products-related activities such as harvesting wild mushrooms? If you don’t know, please skip the question. If yes, please describe as specifically as possible. Has the activity increased, decreased or stayed the same in the last five years?

... continued on page 26

... Continued from page 25

12. Have you or your organization ever done any silvicultural work to increase the value of understorey vegetation, such as thinning, pruning, or adjusting the timing of timber harvest? If you don't know, please skip the question.  
If yes, please describe as specifically as possible. Has the activity increased, decreased, or stayed the same in the last five years?
13. Have there been Aboriginal traditional use studies conducted in the forest you manage (inventories or studies on culturally modified trees (CMTs) or other cultural plant uses, such as foods or medicinals)? If you don't know, please skip the question.
14. Which one of the following most closely describes the affiliation where you spend most of your time?
  - \_ Forest industry (timber)
  - \_ Forest industry (non-timber)
  - \_ Community forest licence
  - \_ Private landowner
  - \_ Woodlot licensee
  - \_ Municipal government
  - \_ Provincial government
  - \_ Federal government
  - \_ Aboriginal government or organization
  - \_ Non-government organization
  - \_ Academic/research
  - \_ Consultant
15. Please select your primary work location.
  - \_ British Columbia
  - \_ Canada other than BC
  - \_ US
  - \_ Outside the US and Canada
16. If you work in BC, please indicate in which region you are located.
  - \_ Coast
  - \_ Southern Interior
  - \_ Northern Interior
  - \_ No specific region (province-wide)
  - \_ I don't work in BC
17. Do you know any examples of "compatible management" within British Columbia? Please describe as specifically as possible.
18. If you know of other individuals or companies involved in compatible management that you recommend we contact, please provide their name, organization, email, and telephone number.
19. Do you have questions or additional information?
20. If you consent to use of your name in our final report, please include your contact information. Contact information is for reference only and will not be shared or publicised without prior consent. You are not required to provide contact information.

## Test Your Knowledge . . .

### *Benefits of and barriers to compatible management for timber and non-timber values in British Columbia: Results of a survey*

How well can you recall some of the main messages in the preceding Discussion Paper?

Test your knowledge by answering the following questions. Answers are at the bottom of the page.

1. Based on this article, what are four perceived benefits of, and opportunities for, compatible management?
2. Based on this article, what are four perceived obstacles to compatible management?
3. Pacific yew (*Taxus brevifolia*) was mentioned in the article because it provides an example of:
  - A) The very high economic returns possible with NTFPs in British Columbia
  - B) Reactive, rather than proactive, legislation
  - C) Effective compatible management

### ANSWERS

1. *Economic diversification; sustainable forest management; financial and other benefits to land manager; increased forest security and sustainable NTFP harvesting.*
2. *Financial costs; lack of policy or regulations; inertia to change; lack of information*
3. *B*